

**Claims:**

1. An antenna for communicating with a mesh network comprising:  
a plurality of phased array elements adapted to synthesize a radiation pattern for communicating with neighboring nodes of a mesh network; and  
a drive circuit for supplying microwave power to the plurality of phased array elements and for controlling a directionality of the radiation pattern.
2. The antenna of claim 1 further comprising:  
an enclosure for housing the plurality of phased array elements and the drive circuit, where said enclosure is approximately 3 cm thick.
3. The antenna of claim 1 wherein the plurality of phased array elements are positioned upon a substrate having dimensions of about 25 cm by about 20 cm.
4. The antenna of claim 1 wherein the directionality is switched in P discrete directions, where P is an integer greater than 1.
5. The antenna of claim 4 wherein P is three corresponding to +45 degrees, center, and -45 degrees.
6. The antenna of claim 1 wherein the elevation of the radiation pattern is fixed.
7. The antenna of claim 1 wherein the elevation of the radiation pattern is fixed at an incline from horizontal.
8. The antenna of claim 1 wherein the drive circuit is coupled to a transceiver and modem circuit.
9. The antenna of claim 1 further comprising an enclosure for the drive circuit and plurality of phased array elements, where the enclosure comprises an adhesive element.
10. The antenna of claim 9 wherein the adhesive element is adapted for attaching

the enclosure to a flat surface.

11. The antenna of claim 1 further comprising a multi-layer circuit board that support the plurality of antenna elements, a ground plane, and the driver circuit.

12. The antenna of claim 1 further comprising a foam core substrate for supporting the plurality of phased array elements.

13. An antenna for communicating with a mesh network comprising:

    a multi-layer circuit board having a first side and a second side, with a ground plane formed within the multi-layer circuit board;

    an antenna array, affixed to the first side of the multi-layer circuit board, having  $M \times N$  array of antenna elements, where  $M$  and  $N$  are integers greater than 1;

    a driver circuit, affixed to the second side of the multi-layer circuit board, having a power divider that divides an input microwave signal into  $M$  signal paths, a plurality of phase shift circuits are coupled to  $M-1$  paths and the output of each phase shift circuit is coupled to an antenna element, one of the  $M$  signal paths is coupled directly to an antenna element.

14. The antenna of claim 13 wherein  $M$  is 5 and  $N$  is 8.

15. The antenna of claim 12 wherein the power divider comprises attenuation in each of the  $M$  signal paths.

16. The antenna of claim 13 wherein the phase shift circuits comprise switched hybrid couplers that, in response to a control signal, phase shift the signals on the  $M-1$  paths by a discrete phase amount.

17. The antenna of claim 16 wherein the discrete phase shift is at least one of  $-90$  degrees,  $0$  degrees and  $+90$  degrees.

18. The antenna of claim 17 wherein the discrete phase shifts cause a main beam of a radiation pattern formed by the array to be directed  $0$  degrees,  $+45$  degrees and

−45 degrees.

19. The antenna of claim 13 further comprising a modem circuit and a transceiver circuit.